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Indian Bay Watershed Roving Creel Survey - Seasonal Catch and Effort Analyses and Estimates

by

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[1]La présente série documente les bases scientifiques des évalutions des ressources halieutiques sur la côte atlantique du Canada. Elle traite des problèmes courant selon les échéanciers dictés. Les documents qu'elle contient ne doivent pas être considérés comme des énoncés définitifs sur les sujets traités, mais plutôt comme des rapports d'étape sur les études en cours.

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Abstract

A roving creel survey was carried out on the Indian Bay, Newfoundland, watershed area in 1994 and 1995. It is estimated that approximately 5100 fish were caught each year. The estimated hours fished per day in 1995 (224 angler-hours per day) was higher than that estimated for 1994 (170 angler-hours per day). The catch per unit effort (CPUE) was similar in the two years (1.16 fish per angler hour in 1994 and versus 1.13 fish per angler hour in 1995). The number of fishable days in 1994 (26 days) was higher than that in 1995 (20 days).

Résumé

Une enquête sur la pêche récréative a été menée dans le bassin versant de la baie Indian, à Terre-Neuve, en 1994 et 1995. On estime que 5 100 poissons ont été capturés chacune de ces années. Le nombre estimatif d'heures de pêche par jour était plus élevé en 1995 (224) qu'en 1994 (170). Les prises par unité d'effort (PUE) étaient semblables pour les deux années étudiées, soit 1,16 poisson par heure de pêche en 1994 et 1,13 en 1995, bien que le nombre de jours propres à la pêche en 1994 (26 jours) était plus élevé qu'en 1995 (20 jours).

Introduction

In recent years, anglers fishing the Indian Bay Brook Watershed have alleged that the quantity and size of brook trout (*Salvelinus fontinalis* Mitchill) have declined. They have suggested that prompt action is required to prevent further deterioration of the resource. A roving creel survey was implemented during the winters of 1994 and 1995 in response to anglers' allegations to collect information on the fishery and to collect biological information on fish populations as part of a wider stock assessment program.

Although the survey design used was not strictly a roving creel survey with progressive counts (e.g., daily starting point was only somewhat random), we treat the data as such. Fishing effort is estimated from the counts, i.e., effort equals average number of anglers fishing during the day × the average length of the day and average number of anglers fishing is estimated by making a count at one (or more) randomly selected times during the day. In these surveys the times were only approximately random. Catch rate (fish per angler-hour) is estimated from the interviews. Then total catch is estimated as catch-per-unit-effort (CPUE) × effort. For more details on the roving creel method with a progressive count see Hoenig et al. (1993).

The following report discusses the usefulness of the roving creel survey. The implications of the biological data collected and their usefulness to management are also discussed. The objectives of the creel survey were:

- to obtain consistent and understandable information as a basis for discussion on management practices by regulatory authorities and anglers; and
- to collect basic biological data in order to characterize and manage brook trout stocks.

Data

The data used in this analysis were collected between February and March of 1994 and 1995. Two survey agents surveyed thirteen ponds: Alley's Pond, Back-up Pond, Big Bear Cave Pond, Big Wings Pond, First Pond, Forked Pond, Four Mile Pond, Fourth (Indian Bay) Pond, Little Wings Pond, Moccassin Pond, Skippers Pond, Southern Pond, and Third Pond. The agents started from base camp; the direction (route) changed each day and sometimes two counts on a pond were taken. There were several days when the survey was done by helicopter/plane ("fly-over"). Interviews of anglers who fished for less than one half hour were not included in the analysis.

If there were double counts (surveyer returned to a pond and did a second count on the same day) they were averaged. The average of the number of hours per day of the survey was needed. According to the interview sheets there were varying start and end times for both years (Table 1). It was decided to find the low and high value that appeared at least three times. It was then decided to use 8-5 (9 hours) as an average day.

Each line of the computerized raw data files we were given was checked against the original interview data sheets and any errors detected were corrected. As a preliminary check of the data, summary statistics for the raw data files (Table 2) and the revised data files (Table 3) for the various ponds for 1994 and 1995 were computed (See Appendix I and II for the revised data for 1994 and 1995). The summaries include numbers of anglers, trout, and holes, as well as trout per hole. The difference between the raw data and the

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revised data is that the revised data set contains key punch corrections as well as changes made to aid in the analysis using the roving creel method. For example, the raw data may contain number of trout caught the day prior to an interview, which isn't included in the revised data file.

Methods

There were N days in the season, n days were sampled, and $N - n$ days were not surveyed. Of the $N - n$ days not surveyed, D were not surveyed because there was no fishing (e.g., major storm or weather too mild) and $N - n - D$ days were not surveyed because of failures (e.g., snowmobile broken, sickness, fly-over days) i.e., an unsampled day with fishing activity.

Seasonal Effort for Pond j

Seasonal effort = $\bar{f}_{j\cdot} \times (N - D)$ where $\bar{f}_{j\cdot}$ is the average daily effort on fishable days on pond j.

We need $\bar{f}_{j\cdot}$ where

$$\bar{f}_{j\cdot} = \frac{\sum_{k=1}^{n} f_{jk}}{n} \tag{1}$$

So, we need f_{jk}:

f_{jk} = the estimated fishing effort on pond j, day k.
= $A_{jk} \times d$ angler hours.

where A_{jk} is the count of anglers on pond j on day k, and d is the length of the fishing day surveyed ($d = 9$ hours). (Note: one count includes all interviews over one "sweep" of a pond. Two or more counts is when the pond is revisited at different times of the day. If two or more counts were recorded the average of the counts for that day was used.)

Catch Rate for Pond j

There are two methods for calculating catch rate. The first method described below is preferred for completed trip (access point) surveys (Pollock et al., in review). Catch rate for pond j, $\widehat{\mathrm{CR}}_j$, is

$$\widehat{\mathrm{CR}}_j = \frac{\sum_l C_{jl}}{\sum_l e_{jl}} \tag{2}$$

where C_{jl} is the number of trout caught by party l and e_{jl} is the number of anglers in an interview $\times$ hours reported for the group.

The second method is the preferred method for a roving creel provided interviews of people fishing for short periods of time are excluded (Pollock et al., in review).

$$\widehat{\mathrm{CR}}_j = \frac{\sum \frac{C_{jl}}{e_{jl}}}{\text{number of interviews}} \tag{3}$$

We used equation (3) to calculate catch rate and eliminated all interviews for people fishing less than one half hour. Only 1 interview was thus excluded.

Seasonal Total Catch for Pond j

The seasonal total catch for pond j is

$$C_j = \bar{f}_{j.} \times (N - D) \times \widehat{\mathrm{CR}_j} \tag{4}$$

Length Frequency Distribution

A length frequency distribution for each pond and for all ponds combined was compiled for those fish where a length sample was taken. Histograms were created to compare 1994 frequencies of fish caught to that of 1995.

Results

Estimates of seasonal effort, catch-per-unit-effort (CPUE), and total seasonal catch for each pond were calculated (Table 4). There was no general increase or decrease from 1994 to 1995. Four of the ponds had increased effort, CPUE and total catch in 1995: Back-Up, Big Wings, Forked, and Southern. The average daily effort for all ponds combined was greater in 1995 (224 angler hours) than 1994 (170 angler hours) whereas the catch-per-unit-effort (CPUE) calculated over all ponds combined was only slightly lower in 1995 (1.13 fish/angler hour) than in 1994 (1.16 fish/angler hour). The total accumulated catch over all of the ponds was only slightly lower in 1995 (5058) than in 1994 (5121). Catch was calculated as effort × CPUE × the length of the season and the 1994 fishing season was almost a week longer (26 fishable days) than the 1995 (20 fishable days) fishing season.

Length Frequency distributions were compiled for 1994 and 1995 based on trout that were measured (Fig. 1). 430 trout out of 906 recorded by survey agents were sampled (about 47 % of the trout caught) in 1994. 304 trout out of 709 recorded by survey agents were sampled (about 43 % of the trout caught) in 1995. The observed catch shows a shift towards larger fish in 1995.

Discussion

Since the late 1980's anglers have expressed concern that large fish in Indian Bay Brook Watershed have declined and suggested that prompt action be undertaken to prevent any further decline. In an attempt to ease public concerns, regulatory authorities implemented as a conservation measure the closure of two ponds, Little Bear Cave Pond and Indian Bay Big Pond, in 1993. A second conservation measure was put in place during the 1995 fishing season to reduce bag limits for brook trout from 25 fish or 10 pounds plus 1 fish to 12 fish or 5 pounds plus 1 fish. Anglers expressed concerns over the pond closures stating they would simply redirect the effort to adjacent ponds in the system. However, the reduction in bag limits was seen as a positive measure in reducing the harvest of large fish. Data on anglers' catch was recorded during the winter fishery of 1994 and 1995. The information was used for discussion between anglers and management authorities.

The design employed in the field was approximately, but not strictly, a roving creel survey with progressive counts. Because the actual implementation was not perfect, we have not attempted to estimate the

precision of the survey. It should be noted that there may be some biases inherent in the estimation. These stem from the fact that some locations may have been surveyed for more than an instant. That is, if the survey agent spent half an hour on a pond collecting interview data, the agent may have counted anglers arriving over a half an hour period. This would cause a positive bias. A second source of bias is that the length of the survey day was not specified clearly and we had to approximate the length of the day from the interview records. This would cause a bias of unknown direction.

Table 4 indicates that the number of angler hours in 1995 (224 angler hours per day) was quite a bit higher than in 1994 (170 angler hours per day). This might suggest an expectation of higher catch in 1995 than in 1994, but that was not the case. In fact, the catch estimates were quite close (5120 and 5058 fish for 1994 and 1995 respectively). This may be due to the length of the fishing season for each year. There were 26 recorded fishable days in 1994 but only 20 recorded fishable days in 1995. If lengths of the season were equal than we would expect that the 1995 catch estimate would have been greater than the 1994 catch estimate.

Overall, catch rates remained virtually unchanged between 1994 and 1995. However, effort did increase on ponds adjacent to the closures, including Skipper's Pond, Back-up Pond, Southern Pond and Little Wings Pond (Table 4). The data agree with anglers' allegations of increased effort on adjacent ponds. The increase in effort is difficult to attribute to the closure, because other factors influencing angler choice were not measured.

The original objective of the reduction in bag limits was to limit the number of fish being taken and limit the proportion of larger fish in the harvest. The anglers perceived this management practice as adequate to mitigate their concerns. However, the reduction in bag limit did not have the desired effect (See Figure 1). One can speculate that the reduction in the bag limit may have caused the angler to select for larger fish. In general, determining the impact of bag limits on a fishery is difficult. Bag limits serve as a tool for allocating harvest among anglers. They also influence the amount of fishing effort and the amount of harvest but in very complicated ways.

Fisheries managers often wish to obtain estimates of the catch per angler per trip and of the fraction of the anglers who catch a given number of fish (e.g., the percentage of anglers who catch the bag limit). Unfortunately, unbiased estimators for these quantities do not exist for roving creel type surveys (Pollock et al., in review).

Statistical Evaluations & Suggestions for the Future

The roving creel survey design allows one to estimate the average daily fishing effort and catch (or the seasonal total fishing effort and catch) for each pond. In addition, one can obtain an estimate of angler success rate (catch rate in fish per angler-hour of fishing effort) as well as biological information such as the length composition of the catch.

It may also be possible to study the spatio-temporal pattern of fishing activity. Thus, one can determine the times of day and the days of the season when the bulk of the fishing activity takes place and one can determine the relative importance of different lakes in terms of fishing effort. This information can be used to improve the sampling design in subsequent years.

It is worthwhile to consider some options for sampling in future years. It may not be necessary to conduct a full fledged creel survey every year after sufficient baseline data have been collected. It may be sufficient to monitor the fishery at a reduced level.

One possibility is to monitor only some of the ponds. Suppose, for example, that during the baseline study period pond "A" had four times the fishing effort as pond "B". In the next two years it may suffice to monitor just pond A and assume the pond B has one quarter the fishing effort estimated for pond A. As time goes on this assumption becomes increasingly questionable so after two years it might be prudent to resurvey pond B.

Another possibility is to conduct a full-fledged creel survey on some ponds and to estimate just the fishing effort on other ponds. In pratice, this means that all ponds are visited but on some ponds just a quick count of anglers is made to estimate fishing effort whereas on the other ponds the angler counts and interviews are made (the interviews requiring considerably more time than the counting).

Counts for a large number of ponds can be made quickly and inexpensively from a small airplane. This would provide valid estimates of fishing effort for each pond in the complex provided the timing of the flight and the route followed were randomized appropriately. Use of a helicopter may be less useful because it is more expensive and slower than an airplane. It may be that if the fishing effort remains stable over time there is no need to conduct a full fledged creel survey every year.

A final possibility is to make counts at specified, fixed times on a pond to obtain an "index" of fishing effort that describes the relative amount of fishing effort. For example, it may be found that the number of anglers fishing at noon time is highly correlated with the total fishing effort over the course of the day. In this case, monitoring the noon-time anglers may indicate the temporal pattern of fishing effort over the days. It might also be possible to develop a calibration procedure to convert noon-time counts of anglers into daily estimates of fishing effort.

Biological/Management Evaluation

Creel surveys provide information on what the harvesters are doing to a population, i.e., on what they are removing. Unless the anglers are completely non-selective for size (i.e., all sizes of fish are equally vulnerable to angling), the anglers' catch does not accurately reflect the composition of the population being exploited. Generally, a research survey is used to try to determine the actual composition of the population. In practice, this may be difficult to do because of the difficulty in identifying non-selective sampling gear or correcting for known selectivity of the sampling gear.

The creel survey data can still provide valuable data on the status of the populations such as biological samples for age, growth, maturity and condition studies. Also, the presence of large fish in the catch is in some way reflective of the presence of large fish in the population.

Conclusion

The winter creel survey provided understandable information as basis for discussion of management practices by regulatory authorities and anglers. The information was useful in allowing the anglers to gain information

on management practices and to evaluate subsequent management options.

References

Hoenig, J.M., D.S. Robson, C.M. Jones, and K.H. Pollock. 1993. Scheduling counts in the instantaneous and progressive count methods for estimating sportfishing effort. N. Amer. J. Fish. Manage. 13:723-736.

Pollock, K.H., J.M. Hoenig, C.M. Jones, D.S. Robson, and C. Greene. (accepted subject to acceptance of companion paper in Biometrics) Catch rate estimation for roving and access point surveys of anglers. N. Am. J. Fish. Manage.

Tables

Table 1: Start time, end time, and length of survey day for 1994 and 1995 winter roving creel surveys for the Indian Bay Watershed ponds.

	1994			1995		
Date	Earliest (time)	Latest (time)	Day Length (hours)	Earliest (time)	Latest (time)	Day Length (hours)
Feb.						
18				9:05	11:00	1.95
19	12:30	18:30	6	9:40	16:00	6.6
20	8:20	17:30	9.1	8:30	17:10	8.8
21	11:15	16:20	5.05	8:30	16:00	7.7
22	8:15	17:10	8.95	9:15	16:00	6.85
23	12:30	15:20	2.9	9:00	14:00	5
24	9:10	16:20	7.1	10:00	13:45	3.45
25	13:30	18:00	4.7			
26	9:05	17:00	7.95	8:05	13:05	5
27	9:15	13:10	3.95	9:00	14:30	5.3
28	11:00	18:05	7.05	7:45	12:00	4.55
Mar.						
01	10:00	15:00	5			
02				9:45	14:35	4.9
03	11:00	15:10	4.1	10:00	14:35	4.35
04				8:00	16:30	8.3
05	8:30	15:00	6.7	7:50	15:10	7.6
06	8:30	16:00	7.7	8:45	13:10	4.65
07	9:30	17:00	7.7	11:05	15:15	4.1
08	9:00	16:30	7.3	9:10	12:30	3.2
09				12:30	15:10	2.8
10	9:30	16:30	7			
11						
12				10:00	17:00	7
13				9:00	9:00	0
14	9:10	17:30	8.2			
15	8:30	16:15	7.85			
16	8:30	17:00	8.7			
17	9:00	18:00	9			
18	9:30	18:00	8.7			
19	9:00	18:30	9.3			
20	10:00	10:00	0			

Table 2. Summary statistics for 1994 and 1995 winter roving creel survey data for the Indian Bay Watershed ponds. This is a summary of the data in the original computer data files

Pond	Anglers (#)		Holes (#)		Trout (#)		Trout/Hole	
	1994	1995	1994	1995	1994	1995	1994	1995
Alley's Pond	73	46	163	105	82	83	0.5	0.79
Back-up Pond	57	86	120	132	159	206	1.32	1.56
Big Bear Cave Pond	48	46	79	95	89	63	1.13	0.66
Big Wings Pond	12	12	17	5	27	2	1.59	0.4
First Pond	5	6	10	9	2	0	0.2	0
Forked Pond	26	45	56	71	55	107	0.98	1.51
Four Mile Pond	45	30	78	36	69	30	0.88	0.83
Fourth (Indian Bay) Pond	21	13	36	31	11	62	0.31	2
Little Wings Pond	45	66	86	54	115	29	1.34	0.54
Moccassin Pond	14	3	36	9	19	6	0.53	0.67
Skippers Pond	37	52	94	98	121	61	1.29	0.62
Southern Pond	66	101	131	107	76	70	0.58	0.65
Third Pond	48	34	82	38	68	45	0.83	1.18
TOTAL	497	540	988	790	893	764	$\hat{x} = 0.883$	$\hat{x} = 0.878$

Table 3. Revised summary statistics for 1994 and 1995 winter roving creel surveys for the Indian Bay Watershed ponds. This is a summary of the data that was used to calculate seasonal catch and effort for each pond. This may differ slightly from the raw data collected due to the nature of analyzing the creel data. That is, some data had to be excluded. See text for further details.

Pond	Anglers (#)		Holes (#)		Trout (#)		Trout/Hole	
	1994	1995	1994	1995	1994	1995	1994	1995
Alley's Pond	73	46	163	105	82	83	0.5	0.79
Back-up Pond	58	86	123	132	165	150	1.34	1.14
Big Bear Cave Pond	49	46	79	95	89	63	1.13	0.66
Big Wings Pond	12	12	21	5	32	2	1.52	0.4
First Pond	10	6	10	9	2	.	0.2	.
Forked Pond	26	45	56	71	55	102	0.98	1.44
Four Mile Pond	45	30	78	36	60	30	0.77	0.83
Fourth (Indian Bay) Pond	21	13	36	31	11	62	0.31	2
Little Wings Pond	45	67	86	69	115	30	1.34	0.43
Moccassin Pond	14	3	36	9	19	6	0.53	0.67
Skippers Pond	39	52	98	98	132	61	1.35	0.62
Southern Pond	66	90	131	104	76	75	0.58	0.72
Third Pond	48	34	82	38	68	45	0.83	1.18
TOTAL	506	530	999	802	906	709	$\hat{x} = 0.875$	$\hat{x} = 0.907$

Table 4. Average daily effort, daily catch-per-unit-effort (CPUE) and seasonal catch results for 1994 and 1995 winter roving creel surveys for the Indian Bay Watershed ponds. Total seasonal catch is calculated form average daily effort × CPUE × number of fishable days. The number of fishable days in 1994 is 26 days and the number of fishable days in 1995 is 20 days. (Note: CPUE for all ponds combined is not a simple average. A weighted average was needed.)

Pond	Average Daily Effort (angler hours)		CPUE (fish/angler hours)		Seasonal Catch (fish)	
	1994	1995	1994	1995	1994	1995
Alley's Pond	25.27	19.12	0.73	1.4	478.61	536.79
Back-up Pond	17.48	35.33	1.04	1.47	473.12	1037.98
Big Bear Cave Pond	16.96	19.8	1.32	0.86	581.51	339.07
Big Wings Pond	4.15	5.4	1.08	2	117	216
First Pond	3.46	2.7	1	.	90	.
Forked Pond	9	16.42	1.64	1.93	383.5	633.99
Four Mile Pond	15.58	13.05	1.27	1.1	516.38	285.86
Fourth (Indian Bay) Pond	7.27	5.85	0.82	3.18	155.4	371.48
Little Wings Pond	15.58	30.15	1.89	.64	764.42	386.09
Moccassin Pond	4.85	0.9	0.43	0.5	54.25	9
Skippers Pond	12.98	22.95	1.19	0.78	401.99	360.02
Southern Pond	22.15	37.35	0.6	0.66	347.23	490.45
Third Pond	15.06	15.3	1.93	1.28	757.4	391.61
All Ponds Combined	169.79	224.32	1.16	1.13	5120.81	5058.34

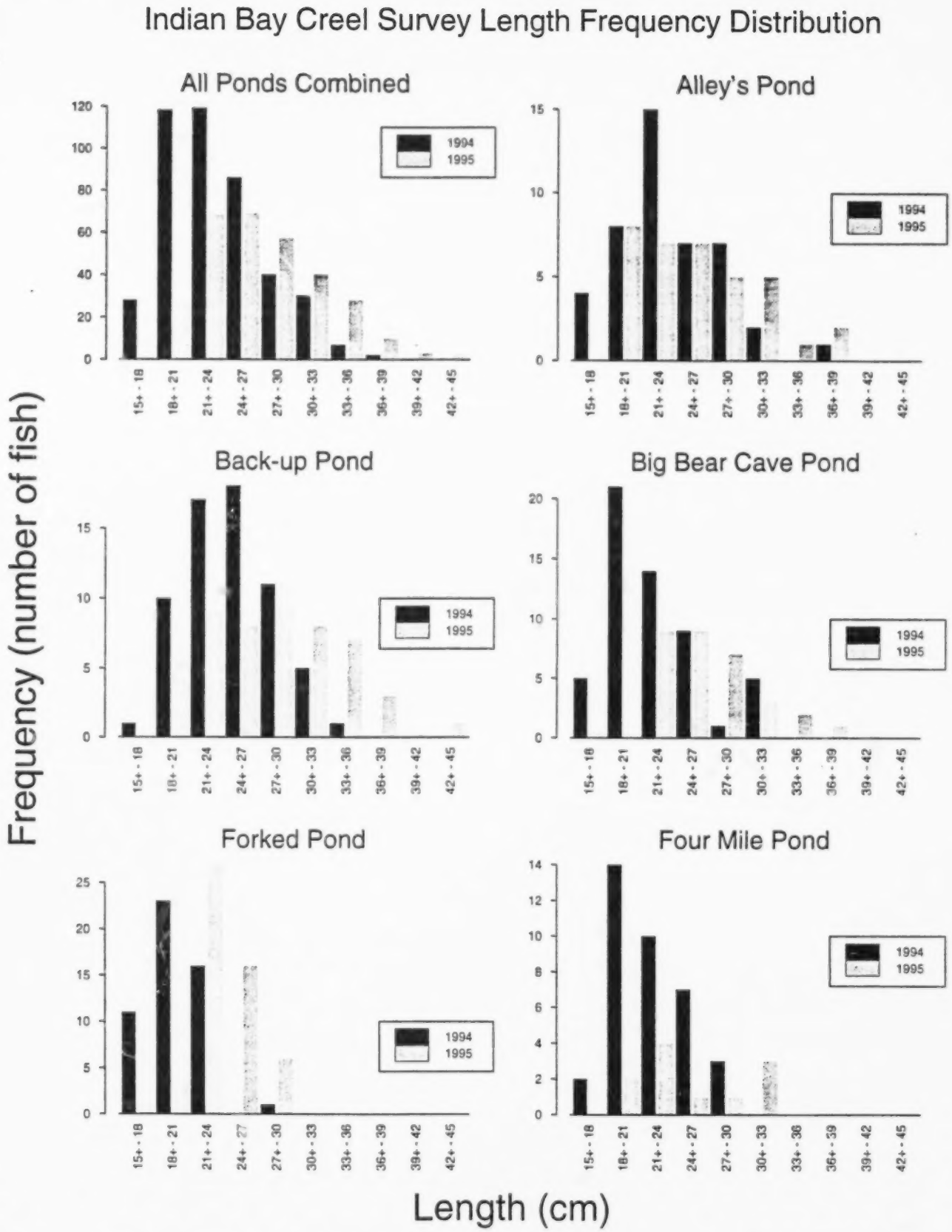
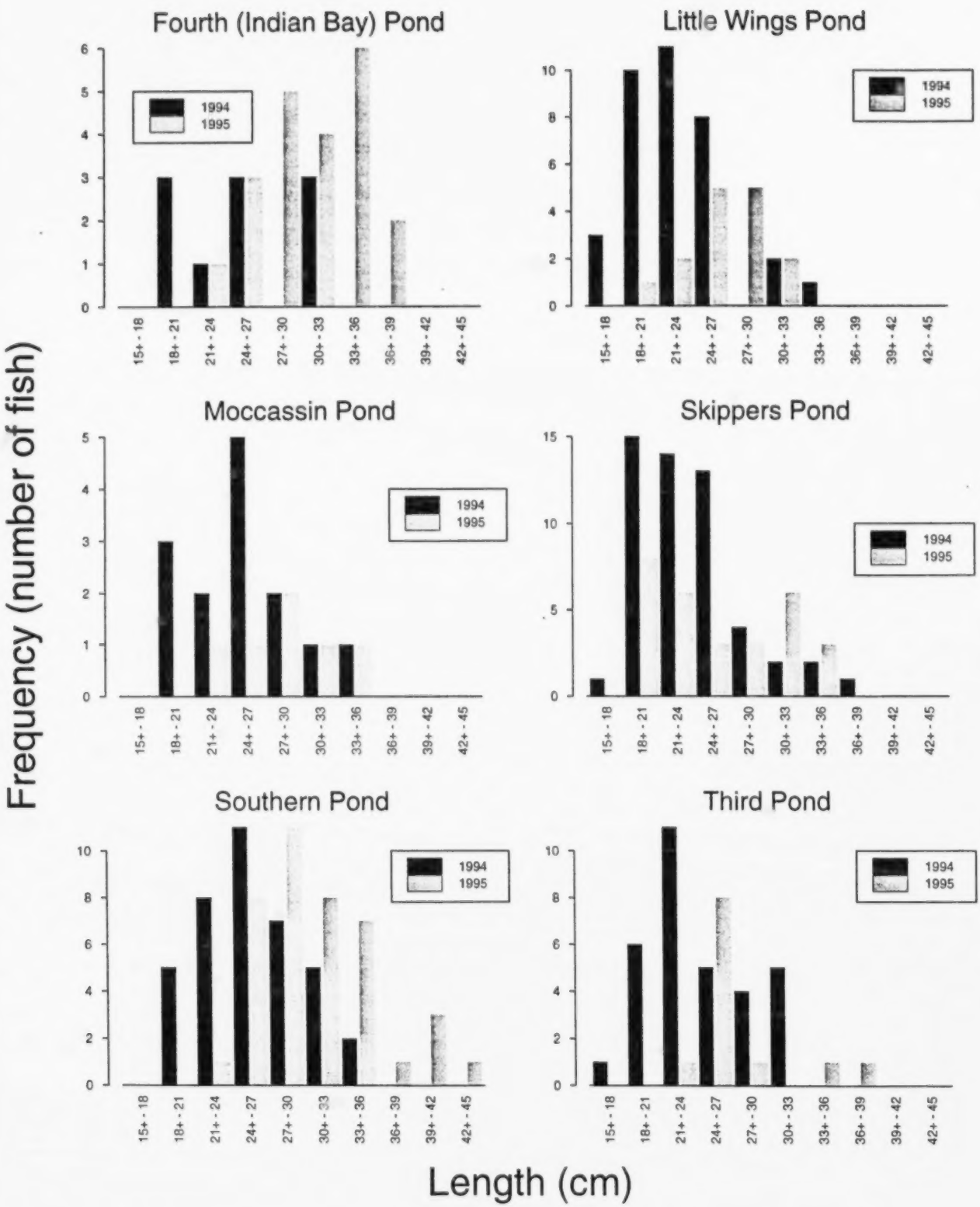


Figure 1. Length frequency (number of fish) distributions for trout measured for the whole watershed area and for each of the ponds surveyed.


Fourth (Indian Bay) Pond
Little Wings Pond
Moccassin Pond
Skippers Pond
Southern Pond
Third Pond
1994
1995
15+ - 18
18+ - 21
21+ - 24
24+ - 27
27+ - 30
30+ - 33
33+ - 36
36+ - 39
39+ - 42
42+ - 45
Frequency (number of fish)
Length (cm)

Appendices

Appendix I: Revised list of interview data surveys for the 1994 winter roving creel surveys for the Indian Bay Watershed ponds. The following ponds correspond to the numbers below: 1) Alley's Pond; 2) Back-Up Pond; 3) Big Bear Cave Pond; 4) Big Wings Pond; 5) First Pond; 6) Forked Pond; 7) Four Mile Pond; 8) Fourth (Indian Bay) Pond; 9) Little Wings Pond; 10) Moccassin Pond; 11) Skippers Pond; 12) Southern Pond; 13) Third; 14) Little Wings Feeders. Under the heading "Pond", the following codes can also occur: 97) unsurveyed fishing day; 98) no survey - too stormy; 99) no survey - too mild. Route number 1 consists of ponds: 1,3,5,6,7,10,11; route number 2 consists of ponds: 2,4,8,9,12,13; route number 12 means a second visit to route 1; route number 22 means a second visit to route 2. Agent number 1 surveyed route 1 and agent number 2 surveyed route 2. If the time of day of the interview was missing from the interview sheets it was approximated in the analysis based on direction of the survey route on that day.

Date (Julian Day (time)	Pond	People (#)	Holes (#)	Sleds (#)	Cabins (#)	Fishing Time (hours)	Trout Kept (#)	Salmon Kept (#)	Trout Released (#)	Salmon Released (#)	Route	Agent
February												
19 (50)												
12:30	11	2	4	2	0	3	10	0	1	0	1	1
12:40	11	2	5	2	0	3	11	0	1	0	1	1
13:00	11	2	2	2	0	4	11	0	0	0	1	1
14:00	2	1	3	1	0	5	4	0	3	1	1	1
14:10	2	1	3	1	0	5	4	0	3	1	1	1
14:20	2	1	3	1	0	3	3	0	3	0	1	1
16:00	12	3	9	.	0	3	6	0	0	0	1	1
16:10	12	3	7	.	0	2	5	0	0	0	1	1
16:25	12	2	4	2	0	0.5	1	0	0	0	1	1
16:50	12	7	12	7	0	4	15	0	0	0	1	1
18:30	7	2	6	2	0	1	1	0	0	0	1	1
20 (51)												
8:20	9	3	8	3	0	0.5	3	0	1	0	1	1
9:30	9	2	6	2	0	0.25	0	0	0	0	1	1
14:20	3	0	0	0	0	0	0	0	0	0	1	1
15:30	6	0	0	0	0	0	0	0	0	0	1	1
16:50	7	2	6	2	0	1	0	0	1	0	1	1
17:30	13	6	6	4	1	1	8	0	1	0	1	1
21 (52)												
11:15	11	4	12	4	0	3	6	0	0	0	1	1
13:45	2	0	0	0	0	0	0	0	0	0	1	1
14:50	1	2	6	2	0	4	7	0	2	0	1	1
15:40	13	3	6	3	0	1	4	0	0	0	1	1
16:00	12	4	6	4	0	2	1	0	0	2	1	1
16:10	12	3	5	3	0	3	5	0	0	2	1	1
16:10	12	2	6	2	0	1	0	0	0	0	1	1
16:20	12	2	4	2	0	0.5	0	0	0	0	1	1
22 (53)												
8:15	11	0	0	0	0	0	0	0	0	0	1	1
9:28	2	0	0	0	0	0	0	0	0	0	1	1
10:45	1	2	6	2	0	1	0	0	0	0	1	1
11:31	10	0	0	0	0	0	0	0	0	0	1	1
14:30	3	2	2	1	0	0.5	2	0	2	0	1	1
15:30	7	0	0	0	0	0	0	0	0	0	1	1
17:10	11	3	6	3	0	1.5	5	0	2	0	12	1
23 (54)												
12:30	9	3	4	2	0	1	5	0	0	0	1	1
14:00	12	1	3	1	0	1	2	0	0	1	1	1
14:45	2	0	0	0	0	0	0	0	0	0	1	1

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Date (*Julian Day*) (*time*)	Pond	People (#)	Holes (#)	Sleds (#)	Cabins (#)	Fishing Time (hours)	Trout Kept (#)	Salmon Kept (#)	Trout Released (#)	Salmon Released (#)	Route	Agent
15:20	11	0	0	0	0	0	0	0	0	0	1	1
24 (55)												
9:10	7	0	0	0	0	0	0	0	0	0	1	1
10:20	3	0	0	0	0	0	0	0	0	0	1	1
11:09	6	0	0	0	0	0	0	0	0	0	1	1
11:50	10	0	0	0	0	0	0	0	0	0	1	1
12:34	1	0	0	0	0	0	0	0	0	0	1	1
13:15	2	0	0	0	0	0	0	0	0	0	1	1
14:10	13	1	3	1	0	1	5	0	2	0	1	1
14:30	13	4	10	4	0	.	.	.	.	.	1	1
15:20	9	6	8	6	0	4	18	0	12	7	1	1
16:20	4	0	0	0	0	0	0	0	0	0	1	1
25 (56)												
13:30	4	0	0	0	0	0	0	0	0	0	1	1
14:00	9	1	3	1	0	0.5	2	0	1	0	1	1
15:00	12	0	0	0	0	0	0	0	0	0	1	1
15:35	13	0	0	0	0	0	0	0	0	0	1	1
16:00	2	3	9	3	0	2	6	0	2	1	1	1
16:40	1	3	2	2	0	3	2	0	1	0	1	1
18:00	7	0	0	0	0	0	0	0	0	0	1	1
26 (57)												
9:05	4	0	0	0	0	0	0	0	0	0	1	1
10:10	9	0	0	0	0	0	0	0	0	0	1	1
10:30	14	0	0	0	0	0	0	0	0	0	1	1
10:50	12	4	2	4	0	0	0	0	0	0	1	1
11:48	8	0	0	0	0	0	0	0	0	0	1	1
12:15	13	1	1	1	0	1	0	0	1	0	1	1
13:15	2	1	2	1	0	0.5	0	0	0	0	1	1
14:00	2	1	2	1	0	2	0	0	0	0	1	1
9:30	7	2	3	2	0	1	0	0	0	0	2	2
9:40	7	1	3	1	0	1	3	0	0	0	2	2
10:30	3	3	7	2	0	1	6	0	6	0	2	2
11:00	6	0	0	0	0	0	0	0	0	0	2	2
11:30	10	2	6	1	0	3	4	0	2	0	2	2
12:30	1	0	0	0	0	0	0	0	0	0	2	2
15:00	11	3	9	3	0	1	3	0	3	0	2	2
.	5	1	2	1	1	2	2	0	0	0	2	2
14:40	13	3	6	3	0	1	4	0	0	0	12	1
15:30	13	5	3	2	0	0.5	2	0	0	1	12	1
16:10	2	3	3	3	0	1	1	0	2	0	12	1
17:00	2	2	4	2	0	2	2	0	2	0	12	1
27 (58)												
9:15	2	0	0	0	0	0	0	0	0	0	1	1
10:10	13	0	0	0	0	0	0	0	0	0	1	1
11:20	12	0	0	0	0	0	0	0	0	0	1	1
12:30	9	0	0	0	0	0	0	0	0	0	1	1
13:10	4	0	0	0	0	0	0	0	0	0	1	1
9:20	11	2	6	2	0	2	2	0	0	0	2	2
9:50	1	0	0	0	0	0	0	0	0	0	2	2
10:15	10	0	0	0	0	0	0	0	0	.	2	2
10:35	6	8	16	5	0	3	23	0	0	0	2	2
11:00	3	3	5	2	0	1	1	0	0	0	2	2
12:00	7	0	0	0	0	0	0	0	0	0	2	2

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Date (*Julian Day*) (*time*)	Pond	People (#)	Holes (#)	Sleds (#)	Cabins (#)	Fishing Time (hours)	Trout Kept (#)	Salmon Kept (#)	Trout Released (#)	Salmon Released (#)	Route	Agent
28 (59)												
13:45	2	2	5	2	0	2	4	0	2	0	1	1
14:25	13	0	0	0	0	0	0	0	0	0	1	1
16:20	8	2	2	2	0	1	4	0	0	0	1	1
11:00	7	0	0	0	0	0	0	0	0	0	2	2
14:00	11	0	0	0	0	0	0	0	0	0	2	2
15:00	1	0	0	0	0	0	0	0	0	0	2	2
18:05	2	6	10	6	0	6	20	0	0	0	12	1
March												
01 (60)												
10:10	2	0	0	0	0	0	0	0	0	0	1	1
11:20	12	2	4	1	0	2	5	0	0	0	1	1
13:15	9	3	9	3	0	4	22	0	12	0	1	1
14:20	4	0	0	0	0	0	0	0	0	0	1	1
10:00	7	0	0	0	0	0	0	0	0	0	2	2
11:00	3	2	2	1	0	1	1	0	0	0	2	2
12:00	6	2	6	1	0	1	10	0	4	0	2	2
12:30	10	0	0	0	0	0	0	0	0	0	2	2
13:00	1	0	0	0	0	0	0	0	0	0	2	2
15:00	11	3	9	2	0	3	4	0	1	0	2	2
02 (61)												
.	97	.	.	.	.	.	.	.	.	.	.	.
03 (62)												
12:30	9	3	9	3	0	2	10	0	4	7	1	1
13:30	12	2	6	2	0	1	2	0	0	0	1	1
14:30	13	4	3	3	0	1	2	0	3	0	1	1
15:00	2	1	3	1	0	1	1	0	0	0	1	1
15:10	2	1	2	1	0	1	1	0	0	0	1	1
11:00	11	0	0	0	0	0	0	0	0	0	2	2
12:00	1	0	0	0	0	0	0	0	0	0	2	2
12:30	10	0	0	0	0	0	0	0	0	0	2	2
13:00	6	0	0	0	0	0	0	0	0	0	2	2
13:30	3	2	2	1	0	3	7	0	3	0	2	2
14:30	7	0	0	0	0	0	0	0	0	0	2	2
04 (63)												
.	97	.	.	.	.	.	.	.	.	.	.	.
05 (64)												
10:05	4	4	5	3	0	4	6	2	10	4	1	1
11:15	9	7	9	7	0	1	3	3	0	0	1	1
11:45	12	5	8	3	0	1.5	2	0	0	2	1	1
12:18	8	0	0	0	0	0	0	0	0	0	1	1
13:25	13	0	0	0	0	0	0	0	0	0	1	1
14:00	2	3	5	2	0	2.5	7	0	0	1	1	1
14:30	2	3	6	3	0	5	22	0	8	6	1	1
8:30	11	0	0	0	0	0	0	0	0	0	2	2
10:00	1	0	0	0	0	0	0	0	0	0	2	2
10:30	10	0	0	0	0	0	0	0	0	0	2	2
11:00	6	0	0	0	0	0	0	0	0	0	2	2
11:30	3	2	2	1	0	1	3	0	1	0	2	2
12:30	3	2	3	1	0	1	2	0	2	0	2	2
15:00	7	0	0	0	0	0	0	0	0	0	2	2
06 (65)												
8:30	11	2	6	1	0	1	3	0	0	0	2	2

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Date (*Julian Day*) (*time*)	Pond	People (#)	Holes (#)	Sleds (#)	Cabins (#)	Fishing Time (hours)	Trout Kept (#)	Salmon Kept (#)	Trout Released (#)	Salmon Released (#)	Route	Agent
9:30	2	5	10	4	0	1	0	0	0	0	2	2
11:30	1	2	3	3	0	1	1	0	0	0	2	2
12:00	1	7	15	2	0	3	10	0	6	0	2	2
13:00	10	0	0	0	0	0	0	0	0	0	2	2
14:00	6	0	0	0	0	0	0	0	0	0	2	2
15:00	3	0	0	0	0	0	0	0	0	0	2	2
16:00	7	2	2	1	0	1	0	0	2	0	2	2
07 (66)												
9:30	2	3	9	3	0	2	6	0	2	0	1	1
10:00	2	2	6	2	0	1	0	0	0	0	1	1
10:30	2	1	1	1	0	3	10	0	1	0	1	1
10:45	2	5	12	5	0	2	0	0	0	0	1	1
11:20	13	2	6	2	0	0.5	5	0	0	0	1	1
11:30	13	3	6	3	0	2	4	0	0	0	1	1
12:00	12	3	6	3	0	2	2	0	1	1	1	1
13:30	4	0	0	0	0	0	0	0	0	0	1	1
14:30	9	0	0	0	0	0	0	0	0	0	1	1
10:30	7	0	0	0	0	0	0	0	0	0	2	2
12:30	3	0	0	0	0	0	0	0	0	0	2	2
14:00	6	0	0	0	0	0	0	0	0	0	2	2
15:15	10	4	8	4	0	4	3	0	3	0	2	2
16:00	1	4	10	4	0	1	0	0	0	0	2	2
17:00	11	3	9	1	0	4	6	0	3	0	2	2
08 (67)												
10:00	2	0	0	0	0	0	0	0	0	0	1	1
10:30	13	0	0	0	0	0	0	0	0	0	1	1
11:05	12	3	3	2	0	0.5	0	0	0	0	1	1
11:50	9	3	3	2	0	1	3	0	1	0	1	1
14:00	4	2	4	2	0	2	2	0	0	0	1	1
16:30	8	3	8	.	0	5	7	0	0	3	1	1
9:00	11	3	9	1	0	7	21	0	5	0	2	2
11:00	1	4	12	4	0	4	16	10	0	0	2	2
13:30	10	0	0	0	0	0	0	0	0	0	2	2
14:15	6	0	0	0	0	0	0	0	0	0	2	2
15:20	3	2	3	1	0	1	1	0	0	1	2	2
16:15	7	0	0	0	0	0	0	0	0	0	2	2
09 (68)												
.	99	.	.	.	.	.	.	.	.	.	.	.
10 (69)												
9:30	11	0	0	0	0	0	0	0	0	0	2	2
10:40	1	0	0	0	0	0	0	0	0	0	2	2
12:15	10	0	0	0	0	0	0	0	0	0	2	2
13:30	6	0	0	0	0	0	0	0	0	0	2	2
14:30	3	3	4	3	0	1	1	0	0	0	2	2
15:00	3	2	3	1	0	2	4	0	1	0	2	2
16:30	7	0	0	0	0	0	0	0	0	0	2	2
11 (70)												
.	99	.	.	.	.	.	.	.	.	.	.	.
12 (71)												
.	99	.	.	.	.	.	.	.	.	.	.	.
13 (72)												
.	99	.	.	.	.	.	.	.	.	.	.	.
14 (73)												

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Date (*Julian Day*) (*time*)	Pond	People (#)	Holes (#)	Sleds (#)	Cabins (#)	Fishing Time (hours)	Trout Kept (#)	Salmon Kept (#)	Trout Released (#)	Salmon Released (#)	Route	Agent
9:10	2	0	0	0	0	0	0	0	0	0	1	1
10:30	13	5	7	5	0	2	16	0	0	0	1	1
11:50	8	3	6	3	0	1	0	0	0	0	1	1
13:00	12	3	5	.	0	3	7	0	0	0	1	1
14:45	9	0	0	0	0	0	0	0	0	0	1	1
14:45	4	0	0	0	0	0	0	0	0	0	1	1
10:00	11	0	0	0	0	0	0	0	0	0	2	2
12:30	1	0	0	0	0	0	0	0	0	0	2	2
13:30	10	0	0	0	0	0	0	0	0	0	2	2
15:00	6	0	0	0	0	0	0	0	0	0	2	2
16:30	3	0	0	0	0	0	0	0	0	0	2	2
17:30	7	0	0	0	0	0	0	0	0	0	2	2
15 (74)												
10:00	9	3	9	3	0	2	7	0	2	0	1	1
12:00	4	0	0	0	0	0	0	0	0	0	1	1
15:00	13	0	0	0	0	0	0	0	0	0	1	1
16:15	2	0	0	0	0	0	0	0	0	0	1	1
8:30	11	0	0	0	0	0	0	0	0	0	2	2
10:45	1	0	0	0	0	0	0	0	0	0	2	2
12:00	10	0	0	0	0	0	0	0	0	0	2	2
14:00	6	0	0	0	0	0	0	0	0	0	2	2
15:30	3	0	0	0	0	0	0	0	0	0	2	2
16:00	7	4	8	2	0	1	16	0	0	0	2	2
16 (75)												
9:00	12	4	12	3	0	4	2	0	3	0	1	1
10:05	13	3	9	3	0	1	6	0	5	2	1	1
14:20	2	4	9	2	0	7	15	0	15	5	1	1
15:15	11	3	3	3	0	1	0	0	0	0	1	1
8:30	11	0	0	0	0	0	0	0	0	0	2	2
10:30	1	3	6	3	0	3	10	0	0	0	2	2
12:30	10	3	9	3	0	3	7	0	0	7	2	2
13:30	5	4	8	2	0	3	9	0	0	0	2	2
15:00	3	1	3	1	0	2	2	0	0	0	2	2
15:30	3	2	4	1	0	2	3	0	1	0	2	2
16:30	3	3	9	3	0	5	15	0	0	0	2	2
17:00	7	0	0	0	0	0	0	0	0	0	2	2
13:45	12	0	0	0	0	0	0	0	0	0	12	1
17 (76)												
14:00	4	4	8	4	0	2	13	0	1	0	1	1
15:00	9	4	4	4	0	3	9	0	0	0	1	1
15:45	12	4	12	3	0	10	17	0	0	0	1	1
16:30	2	4	12	2	0	6	11	0	5	3	1	1
17:00	13	0	0	0	0	0	0	0	0	0	1	1
18:00	8	0	0	0	0	0	0	0	0	0	1	1
9:00	11	0	0	0	0	0	0	0	0	0	2	2
11:00	1	1	3	1	0	1	2	0	0	0	2	2
13:05	1	1	3	1	0	2	3	0	0	0	2	2
14:00	10	0	0	0	0	0	0	0	0	0	2	2
14:30	6	4	8	2	0	2	9	0	0	0	2	2
15:00	3	2	6	2	0	3	0	0	2	0	2	2
15:45	3	2	4	1	0	3	6	0	1	0	2	2
17:30	7	0	0	0	0	0	0	0	0	0	2	2
18 (77)												

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Date (*Julian Day*) (*time*)	Pond	People (#)	Holes (#)	Sleds (#)	Cabins (#)	Fishing Time (hours)	Trout Kept (#)	Salmon Kept (#)	Trout Released (#)	Salmon Released (#)	Route	Agent
9:30	11	1	3	1	0	1	0	0	0	0	1	9
11:00	1	9	22	5	0	2	8	0	0	0	1	9
18:00	7	6	6	6	1	3	12	0	0	0	1	9
19 (78)												
.	1	16	40	12	4	.	.	.	.	.	1	8
.	2	2	4	2	5	.	.	.	.	.	1	8
.	3	4	6	2	0	.	.	.	.	.	1	8
.	4	2	4	2	0	.	.	.	.	.	1	8
.	5	4	8	4	6	.	.	.	.	.	1	8
.	6	8	18	7	1	.	.	.	.	.	1	8
.	7	9	24	7	.	.	.	.	.	.	1	8
.	8	8	20	6	0	.	.	.	.	.	1	8
.	9	7	14	6	0	.	.	.	.	.	1	8
.	10	3	9	3	5	.	.	.	.	.	1	8
.	12	9	17	9	1	.	.	.	.	.	1	8
.	13	8	16	8	0	.	.	.	.	.	1	8
9:00	7	2	4	2	0	2	3	0	1	0	2	2
9:30	7	4	8	2	0	2	6	0	2	0	2	2
10:30	3	2	4	1	0	6	5	0	1	0	2	2
11:00	3	4	10	3	0	3	10	0	0	0	2	2
12:30	6	0	0	0	0	0	0	0	0	0	2	2
14:00	10	2	4	1	0	2	0	0	0	0	2	2
15:20	1	9	27	4	0	3	7	0	5	0	2	2
16:00	1	4	8	1	0	2	2	0	0	0	2	2
17:30	11	2	6	1	0	2.5	8	0	3	0	2	2
18:00	11	2	3	2	0	2	4	0	1	0	2	2
18:30	11	2	6	2	0	5	15	0	3	0	2	2
20 (79)												
.	1	6	0	5	0	.	.	.	.	.	1	8
.	2	3	0	3	0	.	.	.	.	.	1	8
.	3	6	0	6	0	.	.	.	.	.	1	8
.	5	5	0	5	0	.	.	.	.	.	1	8
.	6	0	0	0	0	0	0	0	0	0	1	8
.	7	7	0	6	0	.	.	.	.	.	1	8
.	8	5	0	3	0	.	.	.	.	.	1	8
.	10	0	0	0	0	0	0	0	0	0	1	8
.	13	0	0	0	0	0	0	0	0	0	1	8
10:00	7	4	8	2	1	3	13	0	0	0	2	2

Appendix II: Revised list of interview data surveys for the 1995 winter roving creel surveys for the Indian Bay Watershed ponds. The following ponds correspond to the numbers below: 1) Alley's Pond; 2) Back-Up Pond; 3) Big Bear Cave Pond; 4) Big Wings Pond; 5) First Pond; 6) Forked Pond; 7) Four Mile Pond; 8) Fourth (Indian Bay) Pond; 9) Little Wings Pond; 10) Moccassin Pond; 11) Skippers Pond; 12) Southern Pond; 13) Third; 14) Little Wings Feeders. Under the heading "Pond", the following codes can also occur: 97) unsurveyed fishing day; 98) no survey - too stormy; 99) no survey - too mild. The Notes are coded and mean the following: 1) 8hrs over 2 days (value is halved this current dataset); 2) Fly-overs; 3) Observed people in transit; 4) fish is salmon (not important for this analysis); 5) No cooperation; 6) 6hrs over 2 days (value is halved in this current dataset); Route number 1 consists of ponds: 1,3,5,6,7,10,11; route number 2 consists of ponds: 2,4,8,9,12,13; route number 12 means a second visit to route 1; route number 22 means a second visit to route 2. Agent number 1 surveyed route 1 and agent number 2 surveyed route 2. If the time of day of the interview was missing from the interview sheets it was approximated in the analysis based on direction of the survey route on that day.

Date (*JulianDay* (*time*)	Pond	People (#)	Holes (#)	Sleds (#)	Notes	Cabins (#)	Fishing Time (hours)	Trout Kept (#)	Salmon Kept (#)	Trout Released (#)	Salmon Released (#)	Route	Agent
February													
18 (49)													
9:05	7	2	6	2	2	.	.	.	.	.	.	1	1
9:15	3	4	8	4	2	.	.	.	.	.	.	1	1
9:20	6	4	9	4	2	.	.	.	.	.	.	1	1
11:00	8	3	4	3	.	0	0	0	0	0	6	1	1
.	1	3	9	3	2	.	.	.	.	.	.	1	1
.	2	16	.	16	2	.	.	.	.	.	.	1	1
.	4	10	.	8	2	.	.	.	.	.	.	1	1
.	5	6	9	3	2	.	.	.	.	.	.	1	1
.	8	0	0	0	2	0	0	0	0	0	0	1	1
.	9	25	.	18	2	.	.	.	.	.	.	1	1
.	10	0	0	0	2	0	0	0	0	0	0	1	1
.	12	33	.	28	2	0	0	0	0	0	0	1	1
.	13	10	.	7	2	.	.	.	.	.	.	1	1
19 (50)													
10:00	2	3	9	3	.	0	2	7	0	0	0	1	1
10:05	2	1	3	.	.	0	0.5	1	0	0	0	1	1
10:05	2	1	3	1	.	0	1	0	0	0	0	1	1
10:10	2	2	4	2	.	0	0.5	3	0	0	1	1	1
11:05	13	2	4	1	.	0	2	6	0	0	3	1	1
11:15	13	4	4	1	.	0	3	4	0	0	0	1	1
11:30	12	2	6	2	.	0	2	3	0	0	0	1	1
11:45	9	1	1	1	.	0	1	1	0	0	0	1	1
11:50	9	15	10	.	.	0	0.5	0	0	0	0	1	1
9:40	11	3	9	3	.	.	.	.	.	.	.	2	2
10:00	11	3	5	3	.	0	1	4	0	0	0	2	2
10:15	11	3	6	1	.	0	1.5	2	0	0	0	2	2
10:30	1	4	4	3	.	0	2	2	0	0	0	2	2
10:45	1	3	9	1	.	0	2.5	4	0	0	0	2	2
11:30	10	0	0	0	.	0	0	0	0	0	0	2	2
12:30	6	0	0	0	.	0	0	0	0	0	0	2	2
13:00	3	3	5	2	.	0	0.5	0	0	1	0	2	2
13:30	3	1	1	1	.	0	0.5	0	0	0	0	2	2
16:00	7	4	3	2	.	0	0.5	1	0	0	0	2	2
20 (51)													
8:30	2	1	2	1	.	0	2	2	0	2	0	1	1
9:00	2	5	7	5	.	0	2	3	0	0	0	1	1
9:15	11	0	0	0	.	0	0	0	0	0	0	1	1
9:45	1	0	0	0	.	0	0	0	0	0	0	1	1
10:15	10	0	0	0	.	0	0	0	0	0	0	1	1

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Date (Julian Day) (time)	Pond	People (#)	Holes (#)	Sleds (#)	Notes	Cabins (#)	Fishing Time (hours)	Trout Kept (#)	Salmon Kept (#)	Trout Released (#)	Salmon Released (#)	Route	Agent
10:30	6	0	0	0	.	0	0	0	0	0	0	1	1
10:50	3	4	6	2	.	0	1	3	0	0	0	1	1
11:00	3	1	3	1	.	.	.	.	.	.	.	1	1
11:15	3	1	1	1	.	.	.	.	.	.	.	1	1
14:30	11	2	2	1	.	0	0.5	0	0	0	0	2	1
14:45	1	3	9	1	.	0	5	10	0	6	0	2	1
16:15	3	2	6	1	.	0	3.5	1	0	0	0	2	1
16:40	3	2	6	1	.	0	0.5	0	0	0	0	2	1
17:10	7	2	2	2	.	0	0.5	1	0	0	0	2	1
21 (52)													
8:30	2	3	9	2	.	0	1	1	0	6	0	1	1
10:30	2	0	0	0	.	0	0	0	0	0	0	1	1
10:45	13	4	10	4	.	0	3	6	0	0	3	1	1
11:15	12	4	6	3	.	0	2	5	0	0	0	1	1
11:30	12	2	6	2	.	0	1	3	0	0	0	1	1
11:35	8	0	0	0	.	0	0	0	0	0	0	1	1
12:10	9	1	2	1	.	0	1	0	0	0	0	1	1
12:15	4	2	5	1	.	0	0.5	2	0	0	0	1	1
12:45	11	3	9	2	.	0	2	1	0	1	0	1	1
9:00	11	1	2	1	.	0	2	1	0	0	0	2	2
11:00	1	2	6	2	.	0	3	5	0	1	0	2	2
12:15	6	1	3	1	.	0	1	4	0	0	0	2	2
12:30	10	0	0	0	.	0	0	0	0	0	0	2	2
13:50	3	2	6	2	.	0	3	5	0	3	0	2	2
16:00	7	4	6	2	.	0	0	0	0	0	0	2	2
22 (53)													
9:15	4	0	0	0	.	0	0	0	0	0	0	1	1
10:00	9	0	0	0	.	0	0	0	0	0	0	1	1
10:30	12	2	6	2	.	0	3	6	0	0	0	1	1
11:15	8	0	0	0	.	0	0	0	0	0	0	1	1
13:00	13	0	0	0	.	0	0	0	0	0	0	1	1
14:00	2	0	0	0	.	0	0	0	0	0	0	1	1
12:00	11	0	0	0	.	0	0	0	0	0	0	2	2
12:30	1	3	8	1	.	0	2	7	0	0	0	2	2
13:00	10	0	0	0	.	0	0	0	0	0	0	2	2
13:30	6	0	0	0	.	0	0	0	0	0	0	2	2
14:15	3	2	4	2	.	0	1	1	0	0	0	2	2
16:00	7	0	0	0	.	0	0	0	0	0	0	2	2
23 (54)													
9:00	2	0	0	0	.	0	0	0	0	0	0	1	1
9:30	13	0	0	0	.	0	0	0	0	0	0	1	1
10:30	12	2	6	2	.	0	1	0	0	0	0	1	1
11:30	9	0	0	0	.	0	0	0	0	0	0	1	1
12:30	4	0	0	0	.	0	0	0	0	0	0	1	1
14:00	8	2	6	2	.	0	.	17	0	0	1	1	1
9:15	7	0	0	0	.	0	0	0	0	0	0	2	2
10:10	3	2	6	2	.	0	1	5	0	0	0	2	2
10:30	3	2	6	1	.	0	3.5	3	0	0	0	2	2
11:10	6	2	6	1	.	0	1.5	4	0	0	0	2	2
11:30	10	0	0	0	.	0	0	0	0	0	0	2	2
12:00	1	0	0	0	.	0	0	0	0	0	0	2	2
12:40	11	0	0	0	.	0	0	0	0	0	0	2	2
24 (55)													

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Date (Julian Day) (time)	Pond	People (#)	Holes (#)	Sleds (#)	Notes	Cabins (#)	Fishing Time (hours)	Trout Kept (#)	Salmon Kept (#)	Trout Released (#)	Salmon Released (#)	Route	Agent
10:30	2	0	0	0	.	0	0	0	0	0	0	1	1
11:00	13	0	0	0	.	0	0	0	0	0	0	1	1
12:00	8	0	0	0	.	0	0	0	0	0	0	1	1
13:00	12	2	2	2	.	0	2.5	5	0	0	0	1	1
13:30	9	0	0	0	.	0	0	0	0	0	0	1	1
13:45	4	0	0	0	.	0	0	0	0	0	0	1	1
10:00	11	4	4	3	.	0	0.5	1	0	0	0	2	2
10:30	1	2	6	2	.	0	0.5	4	0	2	0	2	2
10:40	1	2	6	2	.	0	2	3	0	0	0	2	2
11:10	10	0	0	0	.	0	0	0	0	0	0	2	2
11:30	6	0	0	0	.	0	0	0	0	0	0	2	2
12:00	3	0	0	0	.	0	0	0	0	0	0	2	2
12:20	7	3	2	2	.	0	1	5	0	0	0	2	2
25 (56)													
.	99	0	0	0	.	0	0	0	0	0	0	.	.
26 (57)													
8:05	2	2	4	2	.	0	2	11	0	0	0	1	1
10:15	13	2	4	2	.	0	0.5	2	0	0	0	1	1
11:45	8	2	3	2	.	0	1	12	0	0	0	1	1
13:05	13	.	.	3	3	.	.	.	.	.	.	1	1
9:15	11	0	0	0	.	0	0	0	0	0	0	2	2
9:50	1	0	0	0	.	0	0	0	0	0	0	2	2
10:15	10	0	0	0	.	0	0	0	0	0	0	2	2
10:30	6	0	0	0	.	0	0	0	0	0	0	2	2
11:00	3	0	0	0	.	0	0	0	0	0	0	2	2
11:30	7	4	5	1	.	0	0.5	4	0	0	0	2	2
27 (58)													
10:00	4	0	0	0	.	0	0	0	0	0	0	1	1
10:45	9	2	3	2	.	0	2.5	8	0	0	0	1	1
11:50	12	0	0	0	.	0	0	0	0	0	0	1	1
12:30	13	0	0	0	.	0	0	0	0	0	0	1	1
13:20	8	0	0	0	.	0	0	0	0	0	0	1	1
14:30	2	2	6	2	.	0	2	5	0	0	0	1	1
9:00	7	0	0	0	.	0	0	0	0	0	0	2	2
9:40	3	0	0	0	.	0	0	0	0	0	0	2	2
10:30	6	4	2	4	.	0	0.5	1	0	0	0	2	2
10:50	10	0	0	0	.	0	0	0	0	0	0	2	2
11:20	1	0	0	0	.	0	0	0	0	0	0	2	2
11:45	11	0	0	0	.	0	0	0	0	0	0	2	2
28 (59)													
7:45	12	0	0	0	.	0	0	0	0	0	0	1	1
8:30	9	3	9	3	.	0	2	7	0	0	0	1	1
9:10	4	0	0	0	.	0	0	0	0	0	0	1	1
10:00	13	0	0	0	.	0	0	0	0	0	0	1	1
10:30	2	0	0	0	.	0	0	0	0	0	0	1	1
11:00	1	2	6	2	.	0	1	3	0	0	0	1	1
12:00	11	0	0	0	.	0	0	0	0	0	0	1	1
March 01 (60)													
.	99	0	0	0	.	0	0	0	0	0	0	1	1
02 (61)													
10:45	4	0	0	0	.	0	0	0	0	0	0	1	1
11:30	9	0	0	0	.	0	0	0	0	0	0	1	1

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Date (Julian Day) (time)	Pond	People (#)	Holes (#)	Sleds (#)	Notes	Cabins (#)	Fishing Time (hours)	Trout Kept (#)	Salmon Kept (#)	Trout Released (#)	Salmon Released (#)	Route	Agent
12:10	12	2	.	.	3	.	.	.	.	.	.	1	1
13:00	13	6	0	0	.	0	0	0	0	0	0	1	1
13:45	8	0	0	0	.	0	0	0	0	0	0	1	1
14:35	2	0	0	0	.	0	0	0	0	0	0	1	1
9:45	7	5	.	1	.	0	.	14	0	0	0	2	2
10:15	3	0	0	0	.	0	0	0	0	0	0	2	2
10:50	6	0	0	0	.	0	0	0	0	0	0	2	2
11:10	10	0	0	0	.	0	0	0	0	0	0	2	2
11:50	1	0	0	0	.	0	0	0	0	0	0	2	2
12:40	11	1	3	1	.	0	0.5	0	0	0	0	2	2
03 (62)													
11:00	2	2	5	2	4	0	3	8	1	2	0	1	1
11:50	8	2	6	2	.	0	5	20	0	4	2	1	1
14:00	12	2	4	2	.	0	1	4	0	0	0	1	1
14:20	12	2	2	2	.	0	1	0	0	0	0	1	1
14:30	12	2	1	2	.	0	0.5	0	0	0	0	1	1
14:35	12	2	6	2	.	0	4	6	0	0	0	1	1
10:00	11	0	0	0	.	0	0	0	0	0	0	2	2
10:30	1	0	0	0	.	0	0	0	0	0	0	2	2
11:00	10	0	0	0	.	0	0	0	0	0	0	2	2
11:15	6	4	5	3	.	0	1	21	0	0	0	2	2
11:45	3	2	6	2	.	0	2	6	0	0	0	2	2
12:30	3	1	3	1	.	0	2.5	8	0	1	0	2	2
13:00	3	1	1	1	.	0	0.5	0	0	0	0	2	2
13:30	7	0	0	0	.	0	0	0	0	0	0	2	2
04 (63)													
8:30	2	2	6	2	.	0	1.5	2	2	0	0	1	1
8:35	2	1	1	1	.	0	1	3	0	0	0	1	1
9:00	2	3	5	2	.	0	2	3	2	0	4	1	1
9:30	2	2	4	1	.	0	2	7	0	0	0	1	1
10:00	2	2	1	3	.	0	0.5	2	0	1	0	1	1
10:30	13	4	6	3	4	0	2	17	0	0	1	1	1
10:40	13	2	2	2	.	0	1	3	0	1	0	1	1
11:05	12	1	3	1	.	0	1	0	0	0	0	1	1
11:10	12	2	3	1	.	0	0.5	1	0	0	0	1	1
11:15	12	2	3	2	.	0	3.5	10	0	3	9	1	1
12:00	9	2	4	2	.	0	2	4	0	0	0	1	1
12:05	9	2	2	1	.	0	0.5	0	0	0	0	1	1
12:30	9	5	7	4	.	0	0.5	0	0	0	6	1	1
8:00	7	0	0	0	.	0	0	0	0	0	0	2	2
8:30	3	2	1	1	.	0	0.5	0	0	0	0	2	2
9:00	6	1	3	1	.	0	2	0	0	0	0	2	2
9:15	6	3	3	3	.	0	1	7	0	0	0	2	2
9:45	10	0	0	0	.	0	0	0	0	0	0	2	2
10:30	1	2	6	2	.	0	0.5	1	0	0	0	2	2
11:00	1	3	3	3	.	0	0.5	0	0	0	0	2	2
11:30	11	2	2	2	.	0	1	0	0	0	0	2	2
13:00	12	6	6	6	.	0	0.5	1	0	0	6	12	1
13:15	12	3	6	3	5	0	0	0	0	0	0	12	1
13:15	11	0	0	0	.	0	0	0	0	0	0	22	2
13:45	1	1	2	1	.	0	1.5	3	0	0	0	22	2
14:00	1	1	1	1	.	0	1	1	0	0	0	22	2
15:00	10	2	6	2	.	0	3	6	0	0	0	22	2

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Date (Julian Day) (time)	Pond	People (#)	Holes (#)	Sleds (#)	Notes	Cabins (#)	Fishing Time (hours)	Trout Kept (#)	Salmon Kept (#)	Trout Released (#)	Salmon Released (#)	Route	Agent
15:30	6	10	10	5	.	0	3.5	40	0	0	0	22	2
15:45	6	3	9	3	.	0	0.5	2	0	0	0	22	2
16:00	3	2	2	1	.	0	4	3	0	0	0	22	2
16:30	7	2	6	2	.	0	1	1	0	0	0	22	2
05 (64)													
7:50	2	2	6	2	.	0	1	2	0	0	0	1	1
8:10	2	5	5	5	.	0	1	7	0	0	0	1	1
14:30	2	1	3	1	.	1	3	10	0	0	0	1	1
14:45	2	6	7	6	1	1	4	23	0	4	6	1	1
15:10	13	6	8	6	.	0	2	6	0	0	2	1	1
11:10	11	2	6	2	.	0	2	12	0	0	0	2	2
11:15	11	1	3	1	.	0	2	4	0	0	0	2	2
11:30	11	4	6	2	.	0	2	3	0	0	0	2	2
11:45	11	2	2	2	.	0	1.5	2	0	0	0	2	2
11:50	11	3	3	3	.	0	0.5	0	0	0	0	2	2
12:05	1	2	2	1	.	0	1	1	0	0	0	2	2
12:15	1	2	4	1	.	0	1.5	11	0	0	0	2	2
13:00	10	1	3	1	.	0	0.5	0	0	0	0	2	2
13:20	6	4	4	2	.	0	0.5	0	0	0	0	2	2
13:35	6	1	3	1	.	0	0.5	2	0	0	0	2	2
14:00	3	3	7	2	.	0	2	6	0	0	0	2	2
14:30	3	1	3	1	.	0	3	4	0	0	0	2	2
15:00	7	2	2	1	.	0	1	1	0	0	0	2	2
14:15	2	1	3	1	6	0	3	5	0	0	3	12	1
06 (65)													
9:10	4	0	0	0	.	0	0	0	0	0	0	1	1
9:30	9	0	0	0	.	0	0	0	0	0	0	1	1
10:45	12	3	3	3	.	0	2	1	0	0	2	1	1
10:55	12	2	6	2	.	0	4	6	0	0	4	1	1
11:20	13	0	0	0	.	0	0	0	0	0	0	1	1
11:50	8	0	0	0	.	0	0	0	0	0	0	1	1
13:10	2	0	0	0	.	0	0	0	0	0	0	1	1
8:45	11	5	7	2	.	0	1	0	0	0	0	2	2
9:45	1	3	6	2	.	0	2	8	0	0	0	2	2
10:30	10	0	0	0	.	0	0	0	0	0	0	2	2
11:00	6	0	0	0	.	0	0	0	0	0	0	2	2
11:30	3	3	6	2	.	0	1.5	5	0	0	0	2	2
13:00	7	0	0	0	.	0	0	0	0	0	0	2	2
07 (66)													
11:05	4	0	0	0	.	0	0	0	0	0	0	1	1
11:50	9	0	0	0	.	0	0	0	0	0	0	1	1
12:30	12	0	0	0	.	0	0	0	0	0	0	1	1
13:15	13	0	0	0	.	0	0	0	0	0	0	1	1
13:50	2	0	0	0	.	0	0	0	0	0	0	1	1
14:20	8	0	0	0	.	0	0	0	0	0	0	1	1
12:30	11	0	0	0	.	0	0	0	0	0	0	2	2
13:00	1	0	0	0	.	0	0	0	0	0	0	2	2
13:30	10	0	0	0	.	0	0	0	0	0	0	2	2
14:00	6	3	4	2	.	0	1	5	0	0	0	2	2
14:30	3	3	4	2	.	0	3	7	0	0	0	2	2
15:15	7	0	0	0	.	0	0	0	0	0	0	2	2
08 (67)													
9:10	2	0	0	0	.	0	0	0	0	0	0	1	1

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Date (Julian Day) (time)	Pond	People (#)	Holes (#)	Sleds (#)	Notes	Cabins (#)	Fishing Time (hours)	Trout Kept (#)	Salmon Kept (#)	Trout Released (#)	Salmon Released (#)	Route	Agent
9:40	13	0	0	0	.	0	0	0	0	0	0	1	1
10:30	12	2	4	2	.	0	0.5	0	0	0	0	1	1
11:05	12	4	8	4	.	0	3.5	6	0	1	3	1	1
11:30	9	2	4	2	.	0	0.5	0	0	0	0	1	1
11:35	9	4	12	4	.	0	1	0	0	0	0	1	1
11:40	9	3	9	3	.	0	1	5	0	0	0	1	1
11:55	9	2	6	2	.	0	2	5	0	0	0	1	1
12:25	4	0	0	0	.	0	0	0	0	0	0	1	1
9:30	11	0	0	0	.	0	0	0	0	0	0	2	2
10:00	1	0	0	0	.	0	0	0	0	0	0	2	2
10:30	10	0	0	0	.	0	0	0	0	0	0	2	2
11:00	6	0	0	0	.	0	0	0	0	0	0	2	2
11:30	3	0	0	0	.	0	0	0	0	0	0	2	2
12:30	7	0	0	0	.	0	0	0	0	0	0	2	2
09 (68)													
14:30	12	3	7	3	.	0	3	5	0	0	0	1	1
15:10	2	4	0	8	.	0	4	0	0	0	0	1	1
15:10	12	2	4	2	.	0	1	0	0	0	0	1	1
12:30	11	0	0	0	.	0	0	0	0	0	0	2	2
13:30	7	0	0	0	.	0	0	0	0	0	0	2	2
10 (69)													
.	99	0	0	0	.	0	0	0	0	0	0	.	.
11 (70)													
.	98	0	0	0	.	0	0	0	0	0	0	.	.
12 (71)													
10:00	7	2	4	2	2	0	1	3	0	0	0	1	1
16:10	11	2	3	2	.	0	1	5	0	0	0	1	1
16:20	11	2	4	1	.	0	1.5	2	0	0	0	1	1
16:35	11	2	6	1	.	0	3	5	0	0	0	1	1
17:00	8	4	12	3	.	1	2	5	0	4	1	1	1
.	1	8	18	8	2	0	2	11	0	0	0	1	1
.	2	7	21	7	1	1	4	13	0	0	0	1	1
.	2	3	4	2	2	0	2	3	0	0	0	1	1
.	2	7	8	6	2	0	2	12	0	0	0	1	1
.	2	2	6	2	2	0	1	2	0	0	0	1	1
.	3	2	4	1	2	0	2	1	0	0	0	1	1
.	6	5	10	4	2	0	2	16	0	0	0	1	1
.	8	0	0	0	2	0	0	0	0	0	0	1	1
.	10	0	0	0	2	0	0	0	0	0	0	1	1
.	11	5	10	5	2	0	3	15	0	0	0	1	1
.	12	3	6	2	2	0	3	9	0	0	0	1	1
.	13	0	0	0	2	0	0	0	0	0	0	1	1
13 (72)													
9:00	11	2	6	1	.	0	2	3	0	0	0	1	1